

REMARKS

Claim 1 has been amended as set forth above. Accordingly, claims 1-9 remain for consideration in this application.

Claims 1-7 and 9 are rejected under 35 U.S.C. §103(a) as being unpatentable over Tsuboi (Pub. No. US 2001/0048249) in view of Moczala (USP 4,581,553) and Kelly (USP 5,703,417).

As noted in Applicants' previous response, Tsuboi is directed to a sliding unit (sliding means) 1 having a built-in moving magnet linear motor. An elongated steel bed 2 supports an armature assembly 10. Armature assembly 10 includes coil board 11 and armature windings 12. Additionally, track rails 5 are supported upon elongated steel bed 2. The sliding unit 1 has sliders 6 slidably engaged with track rails 5. The sliders 6 are fixed to steel table 3. Also, field magnet 13 is fixed to steel table 3, and is disposed in opposition to armature assembly 10 of the elongated steel bed 2.

Tsuboi does not disclose a magnetic back yoke forming a second gap between it and the field permanent magnet or that the second gap is larger than the first. Further, Tsuboi does not show a magnetic holder made of nonmagnetic material (Kelly shows this). Additionally, Tsuboi does not show a yoke (a magnetic back yoke) which is secured to the stator unit and the armature unit.

Also, as previously noted, Moczala discloses a linear motor having an increased force-to-velocity ratio. As best illustrated in Fig. 4, Moczala discloses stacks 1 and 2 of iron laminations with respective windings 5 and 6. Further, stacks 1 and 2 are provided with pole teeth 9. The unwound motor part comprises a yoke or flux-return structure made up of two toothed parts 7

and 8, which are connected to one another by a connecting part. Permanent magnets 3 and 4 are disposed in the longitudinal direction of stacked core 1, 2. A magnetic back yoke 7 (equivalent to an inductor) has the toothed section 9 positioned opposite the armature through a magnetic gap.

Also, Kelly is simply cited to show a magnetic holder 1a (see Fig. 1) which is made up of a nonmagnetic material.

As noted above, claim 1 has been amended. Specifically, claim 1 has been amended to describe the relationship between the magnetic back yoke, the stator unit, and the armature unit. Specifically this portion of claim 1 is recited as follows:

...wherein a magnetic back yoke is arranged at an anti-armature side of the field permanent magnet, and has a width approximately the same as a width of the field permanent magnet and a length exceeding approximately a stroke of the moving unit, longitudinal ends of the magnetic back yoke being secured to the stator unit and the armature unit,.

Thus, claim 1 has been amended to clarify the relationship in which the magnetic back yoke is secured both to the stator unit and the armature unit.

Applicants wish to thank the Examiner for conducting a telephone interview with the undersigned attorney in the above-identified application. The telephone interview was conducted on January 26, 2010. In the interview, Applicants' representative pointed out some of the beneficial structure in the instant invention. It was stated that in the instant invention, as compared with Tsuboi, separating the magnetic back yoke from the permanent magnet and securing the magnetic back yoke to the stator and armature of Tsuboi enables enhanced performance. For example, since also the invention of claim 1 recites that the permanent magnet

is formed of a nonmagnetic material (which would be a lighter material such as aluminum) there is less mass for the permanent magnet (which is the moving element) to move. Thus improved acceleration/deceleration is possible, since in part, it does not have to carry a heavy back yoke. This structure allows greater thrust and increased acceleration/deceleration in order to improve performance and achieve a long life, even with a high frequency acceleration/deceleration motion.

Additionally, Applicants' representative pointed out another benefit of the structure claimed in the instant invention. Because of the structure in which the back yoke is fixed to the stator unit and the armature unit, the back yoke structure offsets the magnetic flux from the permanent magnet to the stator/armature. In other words, it prevents (by offsetting the magnetic flux) the permanent magnet from being strongly attracted to the stator/armature. Because of the offsetting magnetic flux, there is less drag on the moving portion, which includes the permanent magnet. During the interview, the Examiner pointed out that in his view the reference to Moczala discloses (in Fig. 4) an upper yoke part 7 which is spaced apart from magnets 3 and 4 and windings 5, 6 and stacks 1, 2 which form the moving portion. The Examiner's position was that lower yoke part 8 formed a stator (because it was stationary) which is secured to the upper yoke part 7.

It was decided to amend claim 1, as described above in order to set forth the relationship in which the magnetic back yoke is "secured to the stator unit and the armature unit". In Moczala the armature is the moving portion, including magnets 3, 4 windings 5, 6 and stacks 1, 2. The Examiner agreed that the amended language distinguishes over Moczala because upper

yoke part 7 is not secured to the armature unit including magnets 3, 4, windings 5, 6 and stacks 1, 2.

Claim 8 is rejected under 35 U.S.C. §103(a) as being unpatentable over Tsuboi, Moczala and Kelly, and further in view of Chitayat (USP 5,783,877).

Claim 8 is dependent from claim 1 and limited to the additional feature set forth therein. Accordingly, if claim 1 is allowable, then claim 8 should also be allowable.

In view of the amendments to the claims, and the remarks set forth above distinguishing the claimed invention from the cited prior art references, Applicants submit that the Examiner's rejections have been overcome. Accordingly, it is respectfully requested that the rejections be withdrawn and that claims 1-9 be allowed.

CONCLUSION

In view of the foregoing amendments and accompanying remarks, it is submitted that all pending claims are in condition for allowance. A prompt and favorable reconsideration of the rejection and an indication of allowability of all pending claims are earnestly solicited.

If the Examiner believes that there are issues remaining to be resolved in this application, the Examiner is invited to contact the undersigned attorney at the telephone number indicated below to arrange for an interview to expedite and complete prosecution of this case.

Application No.: 10/582,944
Art Unit: 2834

Amendment under 37 C.F.R. §1.116
Attorney Docket No.: 062528

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,
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